

## **Michael E. Papka**

Argonne National Laboratory  
9700 S. Cass Avenue  
Building 240, Room 4134  
Argonne, IL 60439  
(630) 252-1556  
papka@anl.gov

University of Chicago  
5735 S. Ellis Avenue  
Room 232  
Chicago, IL 60637  
(773) 834-6814  
papka@uchicago.edu

Northern Illinois University  
1425 W. Lincoln Highway  
PM477  
DeKalb, IL 60115  
(815) 753-6498  
papka@niu.edu

## **Research and Professional Experience**

### **Northern Illinois University**

- **Associate Professor**, Department of Computer Science, 2012 - Present

### **Argonne National Laboratory**

- **Division Director**, Argonne Leadership Computing Facility, 2010 - Present
- **Deputy Associate Laboratory Director**, Computing, Environment, and Life Sciences, 2006 - Present
- **Senior Fellow**, University of Chicago / Argonne National Laboratory Computation Institute, 1999 - Present
- **Research Scientist**, Argonne National Laboratory, 1992 - Present
  - Senior Scientist - RD6 (2012 -- Present)
  - Scientist - RD5 (2004 -- 2012)
  - Scientist - RD4 (2001 -- 2003)
  - Scientist - RD3 (2000 -- 2001)
  - Assistant Scientist - RD2 (1996 -- 2000)
  - Scientist Associate - RD1 (1992 -- 1996)

### **University of Illinois at Chicago**

- **Research Assistant** 1992 -- 1994

## **Education and Training**

- **Executive Education** (2013)  
Harvard Business School, Harvard University, Cambridge, MA  
General Management Program
- **Executive Education** (2012)  
Hasso Plattner Institute of Design, Stanford University, Stanford, CA  
Design Thinking Boot Camp: From Insights to Innovation
- **Doctor of Philosophy in Computer Science** (2009)  
Physical Sciences Division, University of Chicago, Chicago, IL  
Dissertation: *Visualization and Collaboration Technologies to Support High-Performance Computing Research*  
Committee: Rick Stevens (Advisor), Todd Dupont, Ian Foster, Mark Hereld, and Ewing Lusk

- **Executive Education** Argonne's Strategic Laboratory Leadership Program (2008, 2012)  
Booth School of Business, University of Chicago, Chicago, IL  
Courses: Effective Leadership, Strategic Thinking, Building and Implementing Growth Strategies, Leading Change and Innovation, and Essentials of Effective Management: The Psychology of Management
- **Master of Science in Computer Science** (2002)  
Physical Sciences Division, University of Chicago, Chicago, IL  
Thesis: *Development and Analysis of a Movie Playback Tool for Use in Tiled Display Environments*  
Advisor: Rick Stevens
- **Master of Science in Electrical Engineering and Computer Science** (1994)  
College of Engineering, University of Illinois at Chicago, Chicago, IL  
Thesis: *Extending Genetic Programming for Discrete Volume Visualization*  
Advisor: Thomas A. DeFanti
- **Graduate Studies in Physics** (1990 -- 1991)  
College of Liberal Arts and Sciences, Northern Illinois University, DeKalb, IL
- **Bachelor of Science Degree in Physics** (1990)  
College of Liberal Arts and Sciences, Northern Illinois University, DeKalb, IL

## Teaching Experience

- Data Visualization - Northern Illinois University (CSCI 490,680) (2012)
- Scientific Visualization - University of Chicago (CMSC 237,337), co-taught with Rick Stevens (2004, 2005)
- Introduction to Collaborative Environments - University of Chicago (CMSC 361), Guest lecturer (2001)
- General Physics Lab - Northern Illinois University (P211 Lab) (1991)

## Awards and Honors

- 2012 Argonne Pacesetter -- *Extraordinary Contribution*
- 2011 Gordon Bell Finalist -- *A New Computational Paradigm in Multiscale Simulations: Applications to Blood Flow*
- 2007 R&D 100 Awardee -- *Access Grid 3.0*
- 2005 Analytics Challenge -- *Real-Time Change Detection and Alerts from Highway Traffic Data* at ACM/IEEE Supercomputing Conference
- 2001 IEEE Visualization, Best Panel - *Commodity Graphics Accelerators for Scientific Visualization Panel*

## Publications

### Journals

1. J. Dongarra, P. Beckman, T. Moore, P. Aerts, G. Aloisio, J. C. Andre, D. Barkai, J. Y. Berthou, T. Boku, B. Braunschweig, F. Cappello, B. Chapman, X. Chi, A. Choudhary, S. Dosanjh, T. Dunning, S. Fiore, A. Geist, B. Gropp, R. Harrison, M. Hereld, M. Heroux, A. Hoisie, K. Hotta, Z. Jin, Y. Ishikawa, F. Johnson, S. Kale, R. Kenway, D. Keyes, B. Kramer, J. Labarta, A. Lichnewsy, T. Lippert, B. Lucas, B. MacCabe, S. Matsuoka, P. Messina, P. Michielse, B. Mohr, M. S. Mueller, W. E. Nagel, H. Nakashima, M. E. Papka, D. Reed, M. Sato, E. Seidel, J. Shalf, D. Skinner, M. Snir, T. Sterling, R. Stevens, F. Streitz, B. Sugar, S. Sumimoto, W. Tang, J. Taylor, R. Thakur, A. Trefethen, M. Valero, A. Van Der Steen, J. Vetter, P. Williams, R. Wisniewski, and K. Yelick, *The International Exascale Software Project Roadmap, International Journal of High Performance Computing Applications*, 25(1):3–60, 2011.

2. R. Fisher, L. Kadanoff, D. Lamb, A. Dubey, T. Plewa, A. Calder, F. Cattaneo, P. Constantin, I. Foster, M. Papka, et al. *Terascale turbulence computation using the flash3 application framework on the IBM Blue Gene/L system*, **IBM Journal of Research and Development**, 52(1.2):127–136, 2008.
3. J. A. Insley, M. E. Papka, S. Dong, G. Karniadakis, and N. T. Karonis, *Runtime Visualization of the Human Arterial Tree*, **IEEE Transactions on Visualization and Computer Graphics**, 13(4):810–821, 2007.
4. J. Silverstein, C. Walsh, F. Dech, E. Olson, M. Papka, N. Parsad, and R. Stevens. *Immersive virtual anatomy course using a cluster of volume visualization machines and passive stereo*, **Studies in Health Technology and Informatics**, 125:439–444, 2007.
5. S. Dong, J. Insley, N. Karonis, M. Papka, J. Binns, and G. Karniadakis. *Simulating and visualizing the human arterial system on the teragrid*, **Future Generation Computer Systems**, 22(8):1011–1017, 2006.
6. J. Binns, J. DiCarlo, J. A. Insley, T. Leggett, C. Lueninghoener, J.-P. Navarro, and M. E. Papka, *Enabling Community Access to TeraGrid Visualization Resources*, **Concurrency and Computation: Practice and Experience**, DOI:10.1002, 2006.
7. K. Keahey, M. Papka, Q. Peng, D. Schissel, G. Abla, T. Araki, J. Burruss, E. Feibus, P. Lane, S. Klasky, et al. *Grid support for collaborative control room in fusion science*, **Cluster Computing**, 8(4):305–311, October 2005.
8. J. Binns, F. Dech, M. Mccrory, M. Papka, J. Silverstein, and R. Stevens. *Developing a distributed collaborative radiological visualization application*, **Studies in Health Technology and Informatics**, 112:70–79, 2005.
9. J. Burruss, G. Abla, S. Flanagan, K. Keahey, T. Leggett, C. Ludesche, D. McCune, M. Papka, Q. Peng, L. Randerston, and D. Schissel. *Developments in remote collaboration and computation*, **Fusion Science and Technology**, 47(3):814–818, 2005.
10. J. Silverstein, F. Dech, J. Binns, D. Jones, M. Papka, and R. Stevens. *Distributed collaborative radiological visualization using access grid*, **Studies in Health Technology and Informatics**, 111:477–481, 2005.
11. D. Schissel, J. Burruss, A. Finkelstein, S. Flanagan, I. Foster, T. Fredian, M. Greenwald, C. Johnson, K. Keahey, S. Klasky, et al. *Building the us national fusion grid: Results from the national fusion collaborative project*, **Fusion engineering and design**, 71(1):245–250, 2004.
12. N. Karonis, M. E. Papka, J. Binns, J. Bresnahan, J. Insley, D. Jones, and J. Link, *High-Resolution Remote Rendering of Large Datasets in a Collaborative Environment*, **Future Generation of Computer Systems**, 19(6):909–917, 2003.
13. R. Stevens, M. Papka, and T. Disz. *Prototyping the workspaces of the future*, **Internet Computing**, IEEE, 7(4):51–58, 2003.
14. J. Ahrens, K. Brislaw, K. Martin, B. Geveci, C. C. Law, M. E. Papka, *Large Scale Data Visualization Using Parallel Data Streaming*, **IEEE Computer Graphics & Applications**, 21(4):34–41 2001.
15. T. DeFanti, I. Foster, M. Papka, R. Stevens, and T. Kuhfuss. *Overview of the I-WAY: Wide-area Visual Supercomputing*, **International Journal of High Performance Computing Applications**, 10(2-3):123–131, 1996.
16. V. Taylor, J. Chen, T. Disz, M. Papka, and R. Stevens. *Interactive virtual reality in simulations: Exploring lag time*, **IEEE Computational Science and Engineering**, 3(4):46–54, 1996.
17. T. Disz, R. Evard, M. Henderson, W. Nickless, R. Olson, M. Papka, and R. Stevens. *Designing the future of collaborative science: Argonne's futures laboratory*, **IEEE Parallel and Distributed Technology: Systems and Applications**, 3(2):14–21, June 1995.

## Proceedings

1. D. Chau, B. McGinnis, J. Talandis, J. Leigh, T. Peterka, A. Knoll, A. Sumer, M. E. Papka, and J. Jellinek, *A Simultaneous 2D/3D Autostereo Workstation*, **Proceedings of SPIE**, 8288:82882N, 2012.

2. K. Moreland, R. Oldfield, P. Marion, S. Jourdain, N. Podhorszki, V. Vishwanath, N. Fabian, C. Docan, M. Parashar, M. Hereld, M. E. Papka, and S. Klasky, *Examples of in transit visualization*, **Second Annual International Workshop on Petascale Data Analytics: Challenges and Opportunities**, pages 1–6. ACM, 2011.
3. M. Hereld, J.A. Insley, E.C. Olson, M.E. Papka, V. Vishwanath, M.L. Norman, and R. Wagner. *Exploring large data over wide area networks*, **2011 IEEE Symposium on Large Data Analysis and Visualization (LDAV)**, pages 133–134. IEEE, 2011.
4. R. Hudson, J. Norris, L. B. Reid, K. Weide, G. C. Jordan, and M. E. Papka, *Experiences Using Smaash to Manage Data-Intensive Simulations*, **The International ACM Symposium on High Performance Parallel and Distributed Computing**, pp. 205–215, 2011.
5. J. A. Insley, L. Grinberg, M. E. Papka, *Visualization of Multiscale Simulation Data: Brain Blood Flow*, **Proceedings of the TeraGrid 2011 Conference: Extreme Digital Discovery**, July 2011.
6. M. Hereld, M. E. Papka, J. A. Insley, M. L. Norman, E. C. Olson, and R. Wagner *Interactive Large Data Exploration of the Wide Area*, **Proceedings of the TeraGrid 2011 Conference: Extreme Digital Discovery**, July 2011.
7. T. D. Uram, M. E. Papka, M. Hereld, and M. Wilde *A Solution Looking for Lots of Problems: Generic Portals for Science Infrastructure*, **Proceedings of the TeraGrid 2011 Conference: Extreme Digital Discovery**, July 2011.
8. A. Knoll, S. Thelen, I. Wald, C. D. Hansen, H. Hagen, and M. E. Papka, *Full-Resolution Interactive CPU Volume Rendering with Coherent BVH Traversal*, **Proceedings of IEEE Pacific Visualization 2011**, pp. 3–9, March 2011.
9. S. Kumar, V. Pascucci, V. Vishwanath, P. Carns, M. Hereld, R. Latham, T. Peterka, M. E. Papka, and R. Ross, *Towards Parallel Access of Multi-Dimensional, Multi-Resolution Scientific Data*, **5th Petascale Data Storage Workshop**, pp. 1–5, November 2010.
10. A. Knoll, S. Thelen, I. Wald, C. D. Hansen, H. Hagen, and M. E. Papka, *Full-Resolution Interactive CPU Volume Rendering with Coherent BVH Traversal*, **Proceedings of IEEE Pacific Visualization 2011**, pp. 3–9, March 2011.
11. V. Vishwanath, M. Hereld, K. Iskra, V. Morozov, M. E. Papka, R. Ross, and K. Yoshii, *Accelerating I/O Forwarding in IBM Blue Gene/P Systems*, **IEEE/ACM International Conference for High Performance Computing, Networking, Storage, and Analysis**, pp. 1–10, November 2010.
12. V. Vishwanath, M. Hereld, K. Iskra, V. Morozov, M. E. Papka, R. Ross, and K. Yoshii, *Accelerating I/O Forwarding in IBM Blue Gene/P Systems*, **IEEE/ACM International Conference for High Performance Computing, Networking, Storage, and Analysis**, pp. 1–10, November 2010.
13. W. Wu, T. D. Uram, M. Wilde, M. Hereld, and M. E. Papka, *A Web 2.0-based Scientific Application Framework*, **2010 IEEE 8th International Conference on Web Services**, pp. 642–643, 2010.
14. W. Wu, T. D. Uram, M. Wilde, M. Hereld, and M. E. Papka, *Accelerating Science Gateway Development with Web 2.0 and Swift*, **Proceedings of the 2010 TeraGrid Conference**, 2010.
15. M. Hereld, R. Hudson, J. Norris, M. E. Papka, and T. D. Uram, *Enabling Scientific Teamwork*, **Journal of Physics: Conf. Series** 180 (2009) 012085.
16. M. Hereld, Eric Olson, M. E. Papka, and T. D. Uram, *Streaming Visualization for Collaborative Environments*, **Journal of Physics: Conf. Series** 125 (2008) 012097.
17. M. Hereld, M. E. Papka, and T. D. Uram, *Collaboration as a Second Thought*, **Collaborative Technologies and Systems**, May 2008, pp. 196–202.

## Technical Reports

1. D. Schissel, J. Burruss, A. Finkelstein, S. Flanagan, I. Foster, T. Fredian, M. Greenwald, C. Johnson, K. Keahey, S. Klasky, K. Li, D. McCune, M. Papka, Q. Peng, L. Randerson, A. Sanderson, J. Stillerman, R. Stevens, M. Thompson, and G. Wallace. *SciDAC fusiongrid project—a national collaboratory to advance the science of high temperature plasma physics for magnetic fusion*. **Technical Report DOE/ER25456**, The Trustees of Princeton University; Princeton Plasma Physics Laboratory; Massachusetts Institute of Technology; Lawrence Berkeley National Laboratory; Argonne National Laboratory; University of Utah, August 2006.
2. N. Karonis, M. E. Papka, J. Binns, J. Bresnahan, and J. Link. *Effective use of dedicated wide-area networks for high-performance distributed computing*. **Technical Report ANL/MCS-P1151-0404**, Argonne National Laboratory, Argonne, Illinois, 2004.
3. T. Udeshi, R. Hudson, and M. E. Papka. *Seamless multiresolution isosurfaces using wavelets*. **Technical Report ANL/MCS-P801-0300**, Argonne National Laboratory, Argonne, Illinois, March 2000.
4. J. Ahrens, C. Law, W. Schroeder, K. Martin, and M. E. Papka. *A parallel approach for efficiently visualizing extremely large, time-varying datasets*. **Technical Report LAUR-00-1620**, Los Alamos National Laboratory, Los Alamos, New Mexico, 2000.
5. J. Bresnahan, J. Insley, and M. Papka. *Interacting with scientific visualizations: User-interface tools within spatially immersive displays*. **Technical Report ANL/MCS-P789-0100**, Argonne National Laboratory, Argonne, Illinois, 2000.
6. T. Disz, R. Olson, M. Papka, R. Stevens, M. Szymanski, and R. Firby. *Two implementations of shared virtual space environments*. **Technical Report ANL/MCS-P652-0297**, Argonne National Laboratory, Argonne, Illinois, 1997.
7. T. Disz, M. E. Papka, M. Pellegrino, and R. Stevens. *CAVEcomm user manual*. **Technical Memorandum ANL/MCS-TM-218**, Argonne National Laboratory, Argonne, IL, December 1996.

## Presentations

### Invited

1. *There's a Supercomputer in My Backyard?* - Chicago Chapter ACM / Loyola University Computer Science Department, Chicago, IL, January 18, 2012
2. *Art of Science* - University of Chicago, Chicago, IL March 11, 2010
3. *Collaborative Visualization* - SciDAC, San Diego, CA June 15, 2009
4. *Collaborative Visualization* - University of Utah, Salt Lake City, UT May 11, 2009
5. *Collaboration as a Second Thought* - DOE PI Meeting, Denver, CO April 1, 2008
6. *Collaboration: Man and Machine* - Grid Summit, Banff, Alberta, April 20, 2005

## Synergistic Activities - Last 5 Years

**Senior Member:** Association for Computing Machinery, **Member:** Institute of Electrical and Electronics Engineers and American Association for the Advancement of Science, **Reviewer:** International Symposium on Visual Computing, IEEE Visualization Conference, IEEE Information Visualization Conference, as well as numerous smaller workshops and conferences, **Reviewer:** National Science Foundation Major Research Instrumentation and Strategic Technologies for Cyberinfrastructure Programs, **Advisory Board:** Microsoft Technical Computing Executive Advisory Council, NCSA Blue Waters Visualization Advisory Panel, Harvard University Computational Science and Engineering Advisory Board.

## Advisees

Predocs - Eric Olson [Programmer - Webfilings]

Postdocs - Aaron Knoll [current-Argonne National Laboratory, August 2012 Staff Scientist, University of Texas], Venkatram Vishwanath [Assistant Scientist, Argonne National Laboratory], Xinlian Liu [Associate Professor, Hood College]